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ASSOCIATION OF SLEEP QUALITY AND ACADEMIC PROFILE WITH STRESS OF NURSING STUDENTS

ASSOCIAÇÃO DA QUALIDADE DO SONO E PERFIL ACADÊMICO COM O ESTRESSE DE ESTUDANTES DE ENFERMAGEM

ASOCIACIÓN DE LA CALIDAD DEL SUEÑO Y DEL PERFIL ACADÉMICO CON EL ESTRÉS DE LOS ESTUDIANTES DE ENFERMERÍA

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Objective: to evaluate the association between sleep quality and academic profile with the level of stress among nursing students. Method: this is a cross-sectional, analytical research, with quantitative approach, performed with 117 nursing students by means of a questionnaire to evaluate academic stress in nursing students and the Pittsburgh Sleep Quality Index. Data were collected in 2016. Data analysis was performed through Fisher's exact test and Student's t-test for independent samples. Results: there was a predominance of medium level of stress (51.3%), followed by a high level of stress (42.7%) and poor sleep quality (94.8%). Students who took, on average, more time to reach the institution of education (p=0.001), studying more hours per day (p=0.014) and performing work activities (p=0.013), had a higher level of stress. There was a significant association between academic stress and sleep quality (p<0.0001). Conclusion: in addition to the academic factors, students experienced personal and social situations that were associated with the level of stress, which affected negatively the quality of sleep and could affect the learning process.

Descriptors: Nursing. Stress, Psychological. Sleep. Students, Nursing.

Objetivo: avaliar a associação da qualidade do sono e o perfil acadêmico com o nível de estresse entre discentes de enfermagem. Método: trata-se de uma pesquisa transversal, analítica, de abordagem quantitativa, realizada com

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117 estudantes de enfermagem por meio de um questionário acadêmico de Avaliação do Estresse em Estudantes de Enfermagem e do Índice de Qualidade de Sono Pittsburgh. Os dados foram coletados em 2016. A análise dos dados foi realizada por meio dos testes de Exato de Fischer e t de Student para amostras independentes. Resultados: verificou-se predomínio de nível médio de estresse (51,3%), seguido por nível alto de estresse (42,7%) e má qualidade de sono (94,8%). Os discentes que levavam, em média, mais tempo para chegar à instituição de ensino (p=0,001), estudavam mais horas por dia (p=0,014) e realizavam atividades de trabalho (p=0,013), possuíam maior nível de estresse. Houve associação significativa entre estresse acadêmico e qualidade do sono (p<0,0001). Conclusão: além dos fatores acadêmicos, os estudantes vivenciavam situações pessoais e sociais que estavam associadas ao nível de estresse apresentado, o qual impactava negativamente na qualidade do sono e podia afetar o processo de aprendizado.

Descritores: Enfermagem. Estresse Psicológico. Sono. Estudantes de Enfermagem.

Objetivo: evaluar la asociación entre la calidad del sueño y el perfil académico con el nivel de estrés entre los estudiantes de enfermería. Método: este es un estudio transversal, analítico, enfoque cuantitativo, realizado con 117 estudiantes de enfermería por medio de un cuestionario para la evaluación del estrés académico en los estudiantes de enfermería y el índice de calidad del sueño de Pittsburgh. Los datos fueron recolectados en 2016. El análisis de los datos se realizó mediante el test exacto de Fisher y la prueba t de Student para muestras independientes. Resultados: hubo un predominio del nivel medio de estrés (51,3%), seguido por un alto nivel de estrés (42,7%) y la mala calidad del sueño (94,8%). Los estudiantes que llevaban, en promedio, más tiempo para llegar a la institución de educación (p=0,001), estudian más horas por día (p=0,014) y la realización de las actividades de trabajo (p=0.013), tenían un alto nivel de estrés. Hubo asociación significativa entre el estrés académico y la calidad del sueño (p<0,0001). Conclusión: además de los factores académicos, estudiantes y personal experimentado situaciones sociales que estaban asociados con el nivel de estrés, lo cual impactaba negativamente en la calidad del sueño y podría afectar el proceso de aprendizaje.

Descriptores: Enfermería. Estrés Psicológico. Sueño. Estudiantes de Enfermería.

Introduction

After college or university admission, students' routine become different from those experienced in high school. This moment of transition leads to new responsibilities and requirements, including the execution of numerous academic works, research activities, extensive mandatory readings, demands regarding deadlines and daily studies[1-2]. Initially, students do not have knowledge about the course, however they commonly create expectations about the subjects and other activities that comprise the course, with chances of frustrations[2].

Investigations on the academic life demonstrates the difficulties related to learning, the interest in the chosen course, the encouragement of the institution for students' engagement and troubles experienced in clinical activities during the practical classes and internships. Moreover, students experience personal and family problems, besides living with the lack of security of big cities. Students can perceives all of these situations as stressors, leading them to academic stress, with influence on physical and mental health[2].

In a biological point of view, stress is understood as a reaction of the organism to external physical or psychological factors, such as fear, euphoria, irritation, excitement, joy, among others, which interfere with the homeostasis and require the body be restored, leading to increased energy consumption for adaptation to the event[1-2]. Furthermore, due to the outbreak of the imbalance of subsystems, changes occur in the brain, heart, neuroendocrine, cognitive and interpersonal levels[2]. In the interactionist model, more currently widespread, the stress is understood as any event resulting from the environment intrinsic or extrinsic to the individual and exceeding or reaching their ability to cope[3]. In the academic environment, the stress occurs when the resources of adaptation are exceeded by the demands related to the training process[3]. The stress and sleep are reciprocally related, because the quality of sleep can be affected by

stress, as well as the poor quality of sleep can become a stressor[4-5].

Sleep is controlled by circadian rhythm in the period of 24 hours of the day, light-dark cycle. This rhythm is regulated by exogenous factors - activities carried out during the day – and endogenous factors – stimuli in the suprachiasmatic nucleus of the hypothalamus, called biological clock. This clock works to regulate the sleep time and support the sleep-wake cycle, but the interference in that cycle can bring serious health problems[5-6]. In this sense, changes in pattern and in the quality of sleep can lead to higher rates of morbidity, mortality and early aging. Once sleep offers important functions in the memory fixing, its deprivation can lead to excessive daytime sleepiness, poor quality of sleep and insomnia, affecting the learning process[6-9].

A study conducted in India with 750 nursing students concluded that students with better quality of sleep had less insomnia and depression, with the ability to study for longer period daily. Furthermore, the quality of sleep is of particular importance among students, while future professionals, because the lack of a recovering sleep contributes significantly to the health care errors during education, as well as competes for higher levels of stress and anxiety among students[10].

In this context, a study conducted with 151 nursing students in the state of São Paulo demonstrated a significant association between poor sleep quality and academic stress. Moreover, the authors observed that the mean sleep duration was 5 hours daily and more than 80.0% reported poor sleep quality[9].

Another study, with 1,074 students from the state of Texas (United States) found, in the group that reported insomnia, lower scores of quality of sleep, as well as higher scores for depressive symptoms and stress[11]. However, although Brazilian[1,4] and international[11] studies have evaluated the direct association between stress and poor sleep quality, few considered the characteristics of academic formation, as well as the social and economic aspects, as factors potentially associated with academic stress in students, especially among those linked to nursing courses. The study of these relations is of particular importance, since, as a result of stress and changes in sleep patterns, university students can develop behavioral changes, including addictions and individual habits, which may interfere with the ability of reasoning and memory and, therefore, negatively affect the learning[1].

This study aimed to evaluate the association between sleep quality and academic profile with the level of stress among nursing students.

Method

This is a cross-sectional, analytical study, developed in two public universities in the state of São Paulo, being one state university (Institution A) and the other, federal (Institution B). The study population consisted of students enrolled in the first year of the nursing course. The sample included students regularly enrolled in the first semester of the first year of each institution and aged over 18 years. Students on exchange programs or maternity leave were excluded.

The individuals were approached through prior scheduling of the responsible researcher with the professors of specific nursing subjects. After authorization and definition of the collection date along with the professor, the researchers delivered the instruments in the classroom, setting a period of 10 days for their recollection, also by the responsible researcher. In the case of absent students, the researcher delivered the questionnaire individually after scheduling date and time through e-mail. To increase the participation in the research, the individual results were sent to each student that participated in the research through e-mail, after the end of data analysis.

The data collection occurred in March 2016, with the following self-applicable instruments: Academic form, Stress-Evaluating Instrument for Nursing Students and Pittsburgh Sleep Quality Index.

The form for academic characterization of students contained the following academic

variables: time spent to arrive at the educational institution and university city; month and year of the beginning of the course; number of subjects in the current semester; course load in the current semester; daily number of hours of study; completion and type of extracurricular activities; participation in research group; work activity; professional experience in the health field; if attended another higher education course; satisfaction with the course; and interest in dropping the course.

The instrument for the *Evaluation of Stress in Nursing Students*, validated for the Brazilian reality by Costa and Polak[12], has 30 items grouped into six areas, as follows: implementation of practical activities; professional communication; time management; environment; professional training; theoretical activity. The items are presented as a 4-point Likert scale, in which: zero – "do not experience the situation"; one – "I do not feel stressed with the situation"; two – "I feel a little stressed with the situation"; and three – "I feel very stressed with the situation". To identify the intensity of stress by instrument factor, risk quartiles were used, as defined by the author of the instrument. The classification of the overall stress level by students followed the guidelines of the authors that validated the instrument, using risk quartiles, with stress classification: low (0-22 points), medium (23-45 points), high (46-67 points) and very high (68-90 points)[12].

The *Pittsburgh Sleep Quality Index*, which evaluates the subjective quality of sleep, was validated in Brazil to verify the quality of sleep in the previous month[13]. This instrument has 14 questions, with 4 open and 10 semi-open. These questions are distributed in 7 components, namely: subjective sleep quality; sleep latency; duration of sleep; usual sleep efficiency; sleep disorders; use of medications to sleep; daytime sleepiness; and disorders during the day. The overall score results from the sum of the points of each component and its weight varies from 0 to 3. Thus, the possible maximum value is 21 points, and the higher the score, the worse the quality of sleep. Individuals with scores higher than five present poor sleep quality[13]. The conversion of the answers obtained in each question into a Likert-type scale followed the instructions described in research with nursing students[14].

For data organization and analysis, a database was created at Excel program (Office 2010), and the Statistical Package for Social Sciences (version 16.0) was used. The instruments were analyzed as previously described, advocating the analysis described by the authors of the instruments. The categorical variables were presented as absolute values (n) and percentage (%). The interval ordinal variables were exposed as descriptive measures: minimum and maximum values, mean and standard deviation. To evaluate the association of classes of stress and categorical academic variables with the quality of sleep, the Fisher's exact test was used. For the analysis of the association between classes of stress and continuous academic variables, the Student's t test was used for independent samples. The results were considered statistically significant if $p<0.05$[15]. For statistical analysis purposes in the association tests, the academic stress was classified into high and low, based on the overall average of the population. The descriptive analysis of stress followed the guidelines of Costa and Polak[12], that is, classification of stress in risk quartiles.

The project was analyzed and approved by the Research Ethics Committee of the two institutions, under Opinions n. 1.363.890, on December 11, 2015, and n. 1.400.103, on February 1, 2016. Complying with the Regulatory Guidelines and Standards for Researches Involving Human Beings (Resolution of the National Health Council n. 466/12), the participants received two copies of the Informed Consent Form with the instruments, to be signed, allowing voluntary participation in the study.

Results

The initial population consisted of 183 students, with 86 from institution A and 97 from institution B. Of these, 143 agreed to participate in the study, but only 117 returned the instruments

completed within the time limit agreed with the researcher (49 from institution A and 68 from institution B).

The students spent an average of 70 minutes to arrive at the institution, which is more than an hour. They had no work activities, were enrolled in approximately 10 to 11 subjects throughout the school year, under a mean semester course load that ranged from 442.9 hours (Institution A) to 848.6 hours (Institution B) and were satisfied with the course. Students with extracurricular activities had no interest in dropping the course and studied approximately 3 hours per day out. There is a predominance of medium level of stress (51.3%), followed by a high level of stress (42.7%) in the students evaluated. There was a predominance of bad sleep quality in 94.8% of the study population.

In Table 1, there is a statistically significant association between the completion of the work activity and the stress level of nursing students (p=0.013), so that those with labor activities presented a stress level lower than the others.

Table 1 – Association between academic (categorical) variables and stress level of nursing students. São Paulo, SP, Brazil – 2017

Academic variables	**Total**	**Stress**[1]		**P**[2]
		Low (60)[3]	**High (57)**	
	n (%)	**n (%)**	**n (%)**	
Work activity[4]				
Yes (Reference Category)	6 (51.2)	-	6(5.2)	0.013**
No		58(50.4)	51(44.3)	
Total		58(50.4)	58(49.5)	
Satisfaction with the course[4]				
Yes		52(45.2)	51(44.3)	0.763
No (Reference Category)		7(6.1)	5(4.3)	
Total		59(51.3)	56 (48.6)	
Interest in dropping the course[4]				
Yes (Reference Category)		19(16.4)	22(19.0)	0.610
No		40(34.5)	35(30.2)	
Total		59(50.9)	57(49.2)	
Extracurricular activities				
Yes (Reference Category)		34(29.1)	32(27.4)	0.952
No		26(22.2)	25(21.4)	
Total		60(51.3)	57(48.8)	
Previous course[4]				
Yes		-	3(2.6)	0.115
No (Reference Category)		59(50.9)	54(46.6)	
Total		59(50.9)	57(49.2)	
Professional experience in the health area[4]				
Yes		7(6.0)	3(0.6)	
No (Reference Category)		52(44.8)	54(46.6)	0.322
Total		59(50.8)	57(47.2)	
Participation in research group[4]				
Yes (Reference Category)		3(2.6)	4(3.5)	0.712
No		56(48.7)	52(45.2)	
Total		59(51.3)	56(48.7)	

Source: Created by the authors.

Note: Conventional signal used:
- Numeric data equal to zero not rounded off.

(1) Fisher's Exact Test.
(2) Statistically significant association (p<0.05).
(3) Population regrouped into two stress groups for statistical analysis purposes.

[4] One or more participants did not answer the question.

Table 2 shows a significant association between the level of stress among nursing students and the time spent by them to reach the educational institution (p=0.001) and daily time to study (in hours) (p=0.014), so that those students with a high level of stress take, on average, more time to reach the educational institution (mean=81.55) and study more hours per day (mean=3.05).

Table 2 – Association between academic (continuous) variables and stress level of nursing students. São Paulo, SP, Brazil – 2016

Academic variables	Stress				p[1]
	Low		High		
	Mean	Standard deviation	Mean	Standard deviation	
Time spent to reach the educational institution (in minutes)	59.49	35.24	81.55	32.29	0.001[2]
Time spent to reach the university city (in minutes)	89.93	38.78	93.89	44.18	0.696
Daily hours of studies	2.43	1.14	3.05	1.45	0.014[2]
Course load in the current semester	722.5	287.10	640.97	305.78	0.180
Number of subjects attended in the semester	9.56	3.13	8.83	2.61	0.188

Source: Created by the authors.

[1] Student's t Test.
[2] Statistically significant association (p<0.05).

There is no statistically significant association between sleep quality and its domains with the classification of stress (Table 3).

Table 3 – Association between sleep quality (Overall and by component) and stress level of nursing students. São Paulo, SP, Brazil – 2016

Pittsburgh Sleep Quality Index (PSQI)	Stress				p[1]
	Low		High		
	Mean	Standard deviation	Mean	Standard deviation	
Overall Sleep Quality (19 PSQI questions)	9.41	5.26	3.12	2.72	<0.0001[2]
Subjective sleep quality	1.46	0.70	1.56	0.80	0.497
Sleep latency	1.15	0.97	1.43	0.94	0.106
Sleep duration	6.06	1.32	5.94	1.53	0.655
Usual sleep efficiency	0.48	0.92	0.43	0.86	0.788
Sleep disorders	2.34	0.60	2.43	0.50	0.307
Use of sleeping medications	0.10	0.47	0.93	0.71	0.409
Daytime sleepiness	2.56	0.62	2.73	0.44	0.090

Source: Created by the authors.

[1] Student's t Test.
[2] Statistically significant association (p<0.05).

Discussion

As advances brought by this research, there stands out the understanding of the relations established between the academic profile and the quality of sleep and the level of academic stress. Such findings may assist in the development of interventions in the nursing education field, with a focus on the factors of sleep and academic environment that contribute to the elevation of the stress, thus reducing the risk of negative health outcomes, with impact on quality of life and performance of nursing students.

Students spent over 1 hour to reach the educational institutions, had no work activities, were enrolled in a remarkable number of subjects, which meant high semi-annual course load in the classroom, were satisfied with the course and were not interested in dropping the course. In a study conducted with 705 nursing students from four Brazilian higher education institutions, 86.6% spent 21 to 40 minutes to reach the educational institution, 74.2% had no work activities, were attending on average 6.7 subjects and had a mean semi-annual course load of 487.2 hours and 98.8% reported being satisfied with the course[16].

A cross-sectional survey also performed with nursing students in Rio Grande do Sul identified a predominance of those who were satisfied with the course (89.8%) and never thought about quitting (63.2%). Although not formally working and feeling satisfied with the course, the students spent a considerable time to reach the educational institution and had high academic load. This accounted for part of the day spent in transit and, therefore, less time available for of academic, social and family activities, which could contribute to the reduced sleep time and higher level of stress[4,16].

Student had extracurricular activities and studied approximately 3 hours per day. In this sense, a study conducted with nursing students in Rio Grande do Sul mentions that nursing students remained around 9 hours a day with tasks and teachings and reported difficulties harmonizing them with the personal occupations, which interfered negatively in stress and in the quality of sleep[4]. A study conducted with 157 medical students from a private university verified average sleep duration of 6.8 hours and bad sleep quality in 44.5% of the sample[17]. A study with 540 Lebanese students found that smoking and the study during the early morning hours were contributing factors to decreased quality of sleep of the students[18]. In this sense, some factors may influence this practice of bad sleeping habits of nursing students, as well as psychological factors, where they sleep, sleep time and life style, with final impact on quality of life and sleep[16,19].

There is a predominance of medium level of stress, followed by a high level of stress, in the evaluated students. A study conducted with nursing students from three public universities and from one private university showed high level of stress for 20.0% of the students and medium level for 40.7% of this population[16]. Another study conducted with 705 nursing students from two Brazilian regions (South and Southeast) identified that 74.4% of them presented a medium level of stress and 15.10%, high level of stress[4]. This is an important aspect, since high levels of stress can interfere negatively in the learning process and, therefore, in the academic performance and adhesion to the course, besides negatively affecting the student's physical and mental health[4,16]. This was verified in a study with 151 students from São Paulo, in which the academic stress was associated with a higher incidence of sleep disorder, anxiety, fatigue, headache, depression and low quality of life[12].

The analysis of the quality of sleep in this study population showed a predominance of bad sleep quality. A survey with 151 students from a Nursing School of the University of São Paulo found that 78.8% had poor quality of sleep[12]. Nevertheless, a study about sleep deprivation, performed with nursing students and students in the health area describes that sleep deprivation changed the academic performance of 88.5% of respondents and that 62.5% of these reported the study as the biggest reason for sleep deprivation, followed by high academic hourly loads. The same study shows that most students woke up and remained tired throughout the day, which relates to the time in hours without sleeping[7]. Therefore, this

may be a factor that leads to stress, decreased or lack of concentration and anxiety, with university students as the most prone to stress, poor quality of sleep and even symptoms of depression[7].

The association of academic variables and quality of sleep with stress showed that those students without labor activities had a lower level of stress; those who spent, on average, more time to reach the teaching institution and studied more hours per day had a higher level of stress than the others did. Furthermore, in this study, there was a significant association between sleep quality and academic stress. A study with 151 students from the city of São Paulo showed that the work activity, academic year and time of daily studies contributed to the low quality of sleep, with this associated with academic stress[12]. A study with 540 students from the Middle East found that reduced sleep time and variation in the sleep time between week days and weekends contributed significantly to the poor quality of sleep[19]. Due to the time spent on the daily transportation, especially in big cities, students have less time for rest and external academic activities. Thus, they end up deprived of sleep after returning to their homes to meet the university demands, which alters the quality of sleep and contributes to a higher level of stress[9,12-13,18].

Some limitations of the study include the difficulty finding researches at national and international levels, especially assessing the impact of academic profile on stress and sleep quality in nursing students, which hindered the comparison of the findings of this research with others involving students in the same area. In addition, this study involved students inserted into the reality of a large metropolis and from federal and state public institutions.

Conclusion

Nursing students had medium to high level of stress and poor sleep quality, phenomena that are significantly associated. Some elements of the academic profile contributed to raising the stress in students, including work activity, time to reach the institution and daily hours of study.

In this sense, daily life conditions, typical of large cities, such as the daily time spent in the home-university path, as well as academic characters, such as the daily time to study, contribute to increase the stress in students. On the other hand, having no labor activity, possibly by allowing more time available to study, implies a lower level of stress in this population.

Thus, in addition to academic factors, students experience personal and social situations that are associated with the level of stress, which affects negatively the quality of sleep, the cognitive process and learning.

Collaborations:

1 – conception, design, analysis and interpretation of data: Cíntia Taumaturgo Fernandes de Negreiros, Sarah Rebecca Sousa da Silva, Rodrigo Marques da Silva and Ana Lúcia Siqueira Costa;

2 – writing of the article and relevant critical review of the intellectual content: Cíntia Taumaturgo Fernandes de Negreiros, Sarah Rebecca Sousa da Silva, Rodrigo Marques da Silva, Ana Lúcia Siqueira Costa, Fabiane Coelho Farias, Débora Dadiani Dantas Cangussu and Cristilene Akiko Kimura;

3 – final approval of the version to be published: Cíntia Taumaturgo Fernandes de Negreiros, Sarah Rebecca Sousa da Silva, Rodrigo Marques da Silva, Ana Lúcia Siqueira Costa, Fabiane Coelho Farias, Débora Dadiani Dantas Cangussu and Cristilene Akiko Kimura.

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